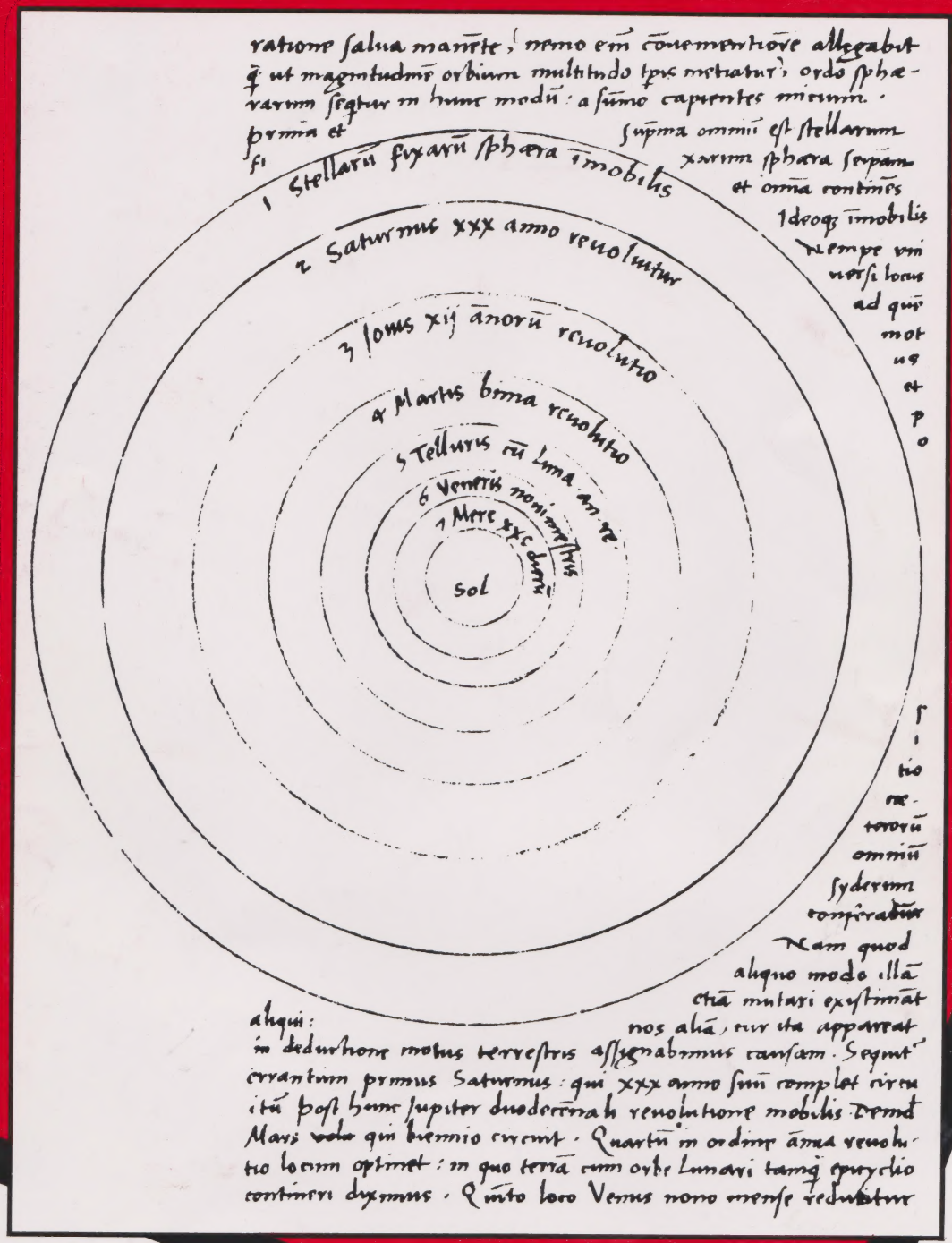
THE OPEN UNIVERSITY
S102: A SCIENCE FOUNDATION COURSE

SCIENCE

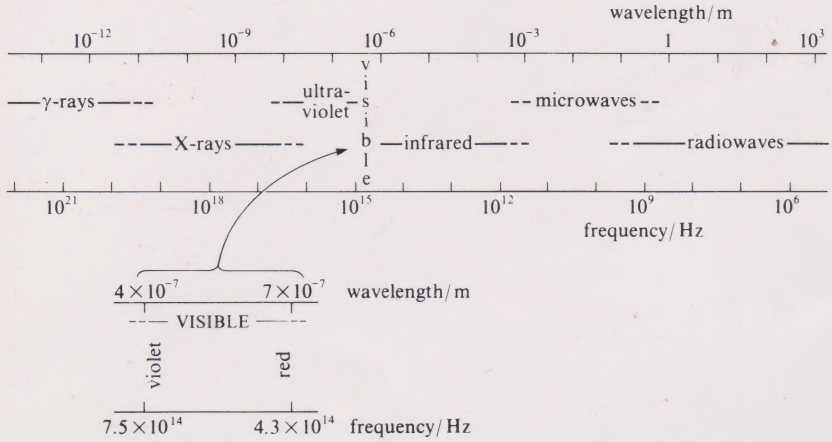


Unit 1
Science and the planet Earth

Unit 2
Measuring the Solar System

USEFUL INFORMATION FOR THE PHYSICS AND GENERAL SCIENCE UNITS

ELECTROMAGNETIC SPECTRUM



PHYSICAL CONSTANTS

Symbol	Quantity	Approximate value
G	gravitational constant	$6.672 \times 10^{-11}\,\mathrm{N\,m^2\,kg^{-2}}$
c	speed of light in a vacuum	$2.998 \times 10^{8}\,\mathrm{m\,s^{-1}}$
h	Planck's constant	$6.626 \times 10^{-34}\,\mathrm{J\,s}$
e	magnitude of the charge of the electron	$1.602 \times 10^{-19}\,\mathrm{C}$
m_e	mass of the electron	$9.110 \times 10^{-31}\,\mathrm{kg}$
m_n	mass of the neutron	$1.675 \times 10^{-27}\,\mathrm{kg}$
m_p	mass of the proton	$1.673 \times 10^{-27}\,\mathrm{kg}$

USEFUL QUANTITIES AND CONVERSIONS

$\pi \approx 3.142$

1 mile $\approx$ 1.609 km

1 kilometre (km) $\approx$ 0.6214 mile

1 inch = 2.54 cm

1 centimetre (cm) $\approx$ 0.3937 inch

1 kilocalorie $\approx$ 4 187 J

1 electronvolt (eV) $\approx 1.602 \times 10^{-19}$ J

1 radian $\approx$ 57.296 degrees

1 degree $\approx$ 0.01745 radian

1 GeV/c^2 $\approx 1.783 \times 10^{-27}$ kg

Earth radius (equatorial) $\approx 6.38 \times 10^{6}$ m

circumference of the Earth (distance round the Equator) $\approx 4.01 \times 10^{7}$ m

radius of the Moon $\approx 1.74 \times 10^{6}$ m

radius of the Sun $\approx 6.96 \times 10^{8}$ m

Earth–Sun distance (i.e. orbital radius of the Earth) $\approx 1.50 \times 10^{11}$ m

Earth–Moon distance (i.e. orbital radius of the Moon) $\approx 3.84 \times 10^{8}$ m

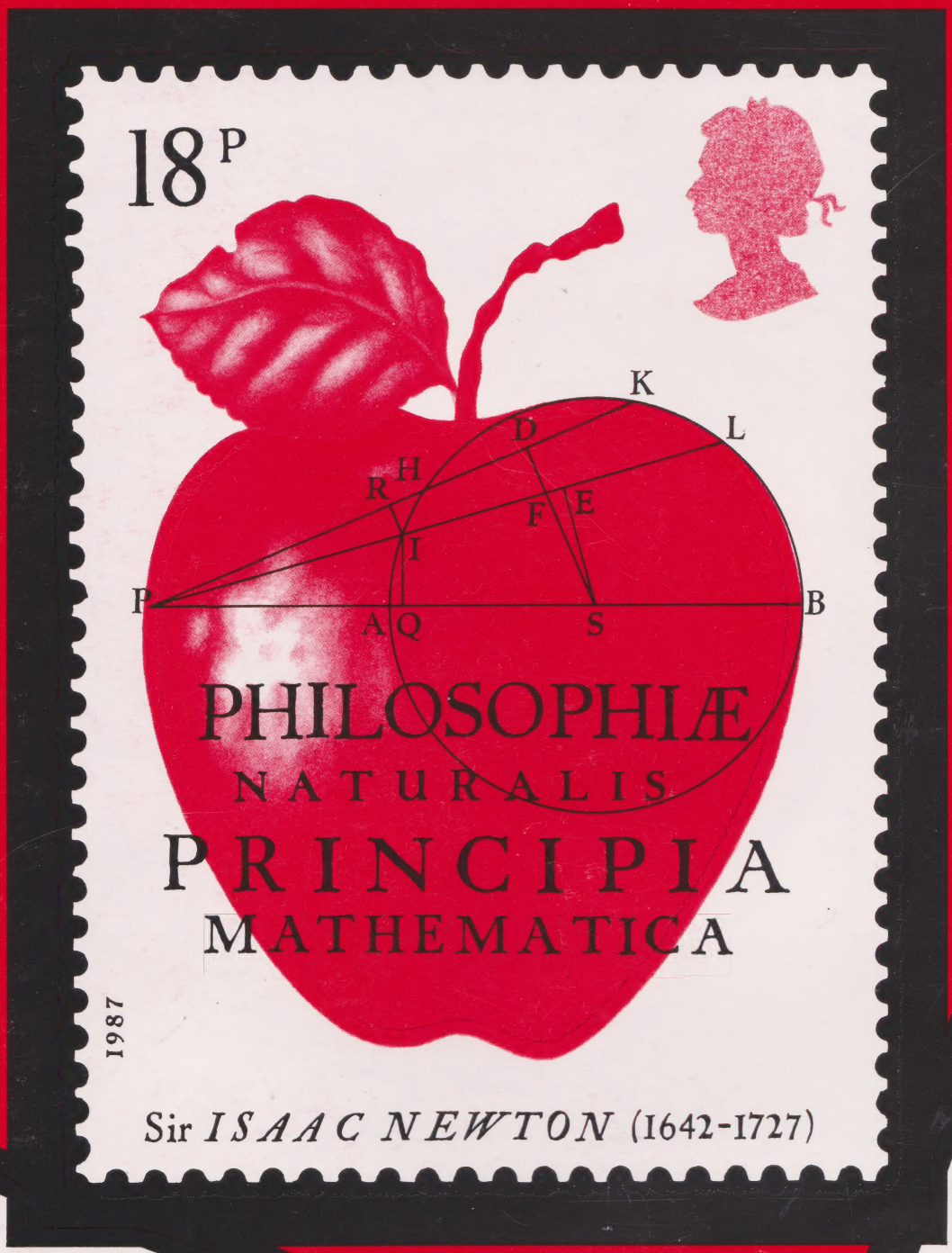
S102 UNITS

1	Science and the planet Earth
2	Measuring the Solar System
3	Motion under gravity
4	Practical work in science
5–6	Into the Earth: earthquakes, seismology and the Earth's magnetism
7–8	Plate tectonics: a revolution in the Earth sciences
9	Energy
10	Modelling the behaviour of light
11–12	Atomic structure
13–14	Chemical reactions and the Periodic Table
15	Chemical equilibrium
16	Chemical energetics
17–18	The chemistry of carbon compounds
19	Life and evolution
20	Inheritance and cell division
21	Genes and evolution
22	Biochemistry
23	Physiology
24	DNA: molecular aspects of genetics
25	Ecology
26	Biology reviewed
27	Earth materials and processes
28–29	Geological time and Earth history
30	Quantum mechanics: an introduction
31	Quantum mechanics: atoms and nuclei
32	The search for fundamental particles

ISBN 0 335 16325 4

THE OPEN UNIVERSITY
S102: A SCIENCE FOUNDATION COURSE

SCIENCE

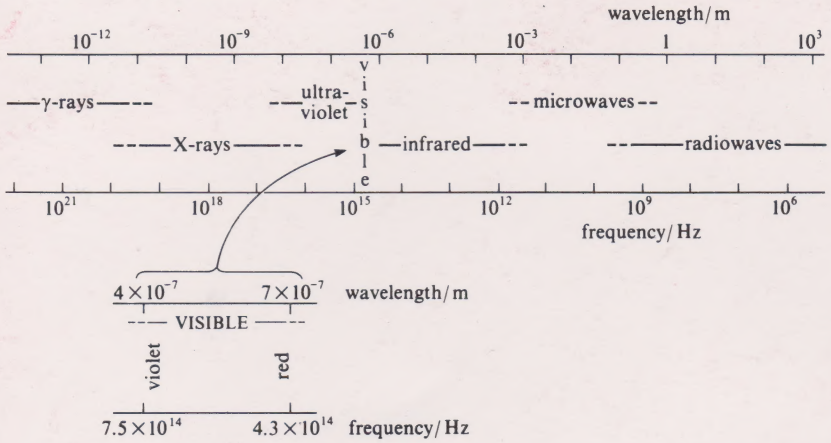


Unit 3
Motion under gravity

Unit 4
Practical work in science

USEFUL INFORMATION FOR THE PHYSICS AND GENERAL SCIENCE UNITS

ELECTROMAGNETIC SPECTRUM



PHYSICAL CONSTANTS

Symbol	Quantity	Approximate value
G	gravitational constant	$6.672 \times 10^{-11}\,\mathrm{N\,m^2\,kg^{-2}}$
c	speed of light in a vacuum	$2.998 \times 10^{8}\,\mathrm{m\,s^{-1}}$
h	Planck's constant	$6.626 \times 10^{-34}\,\mathrm{J\,s}$
e	magnitude of the charge of the electron	$1.602 \times 10^{-19}\,\mathrm{C}$
m_e	mass of the electron	$9.110 \times 10^{-31}\,\mathrm{kg}$
m_n	mass of the neutron	$1.675 \times 10^{-27}\,\mathrm{kg}$
m_p	mass of the proton	$1.673 \times 10^{-27}\,\mathrm{kg}$

USEFUL QUANTITIES AND CONVERSIONS

$\pi \approx 3.142$

1 mile $\approx$ 1.609 km

1 kilometre (km) $\approx$ 0.6214 mile

1 inch = 2.54 cm

1 centimetre (cm) $\approx$ 0.3937 inch

1 kilocalorie $\approx$ 4 187 J

1 electronvolt (eV) $\approx 1.602 \times 10^{-19}$ J

1 radian $\approx$ 57.296 degrees

1 degree $\approx$ 0.01745 radian

1 GeV/$c^2 \approx 1.783 \times 10^{-27}$ kg

Earth radius (equatorial) $\approx 6.38 \times 10^{6}$ m

circumference of the Earth (distance round the Equator) $\approx 4.01 \times 10^{7}$ m

radius of the Moon $\approx 1.74 \times 10^{6}$ m

radius of the Sun $\approx 6.96 \times 10^{8}$ m

Earth–Sun distance (i.e. orbital radius of the Earth) $\approx 1.50 \times 10^{11}$ m

Earth–Moon distance (i.e. orbital radius of the Moon) $\approx 3.84 \times 10^{8}$ m

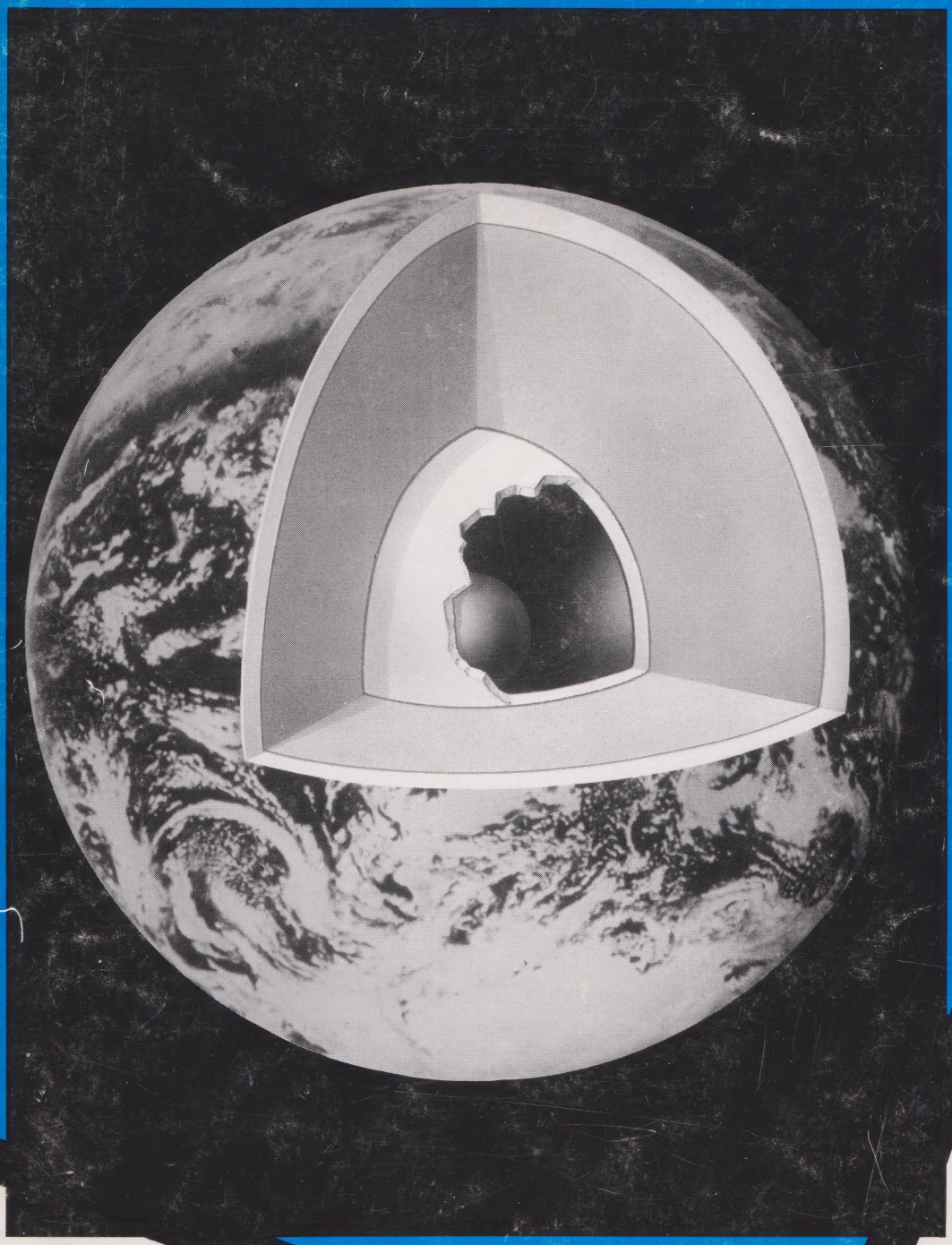
S102 UNITS

ISBN 0 335 16326 2

S102 UNITS 5–6

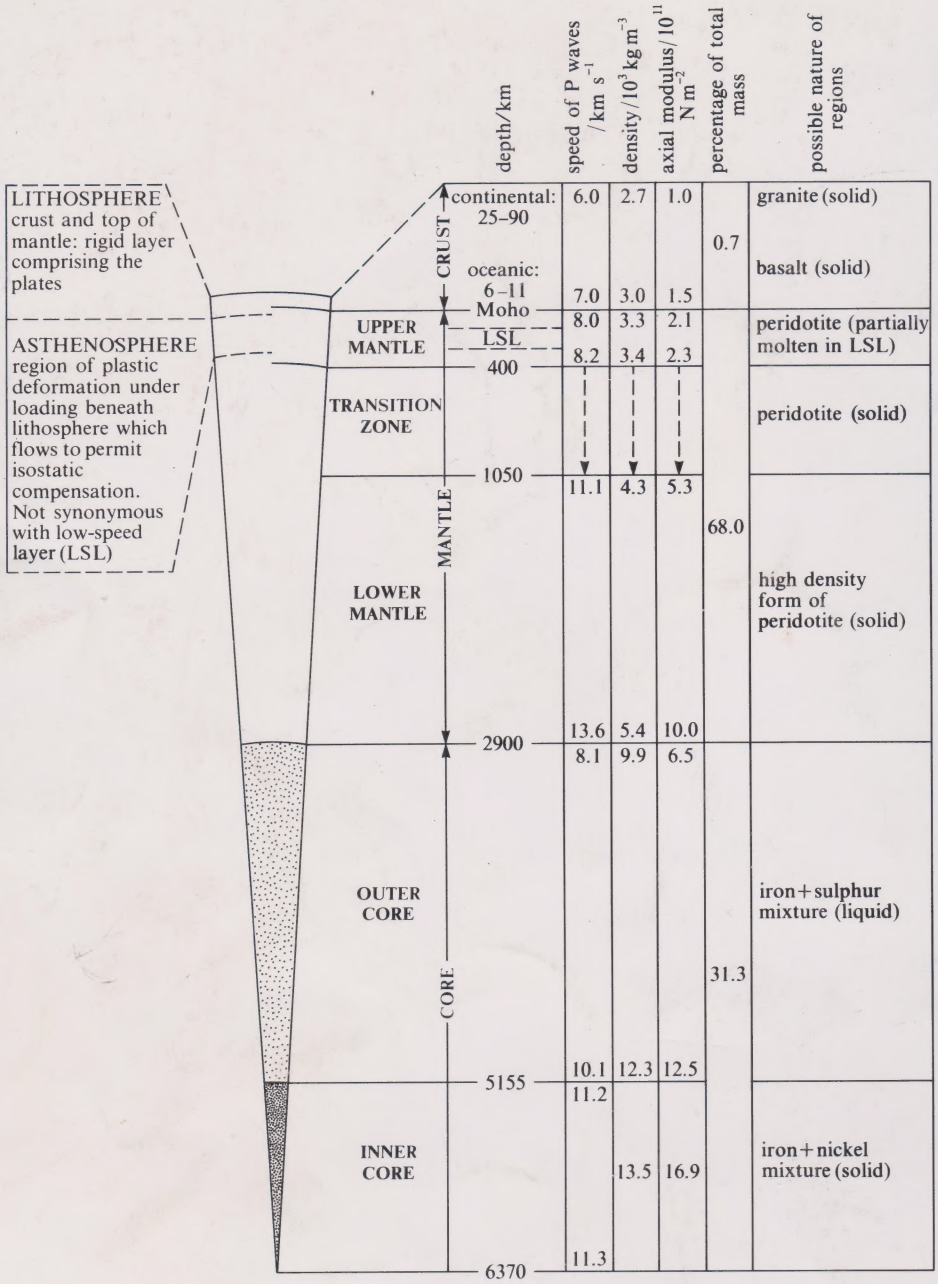
THE OPEN UNIVERSITY
S102: A SCIENCE FOUNDATION COURSE

SCIENCE



Units 5–6
Into the Earth: earthquakes, seismology and the Earth's magnetism

PROPERTIES OF THE EARTH'S INTERIOR



S102 UNITS

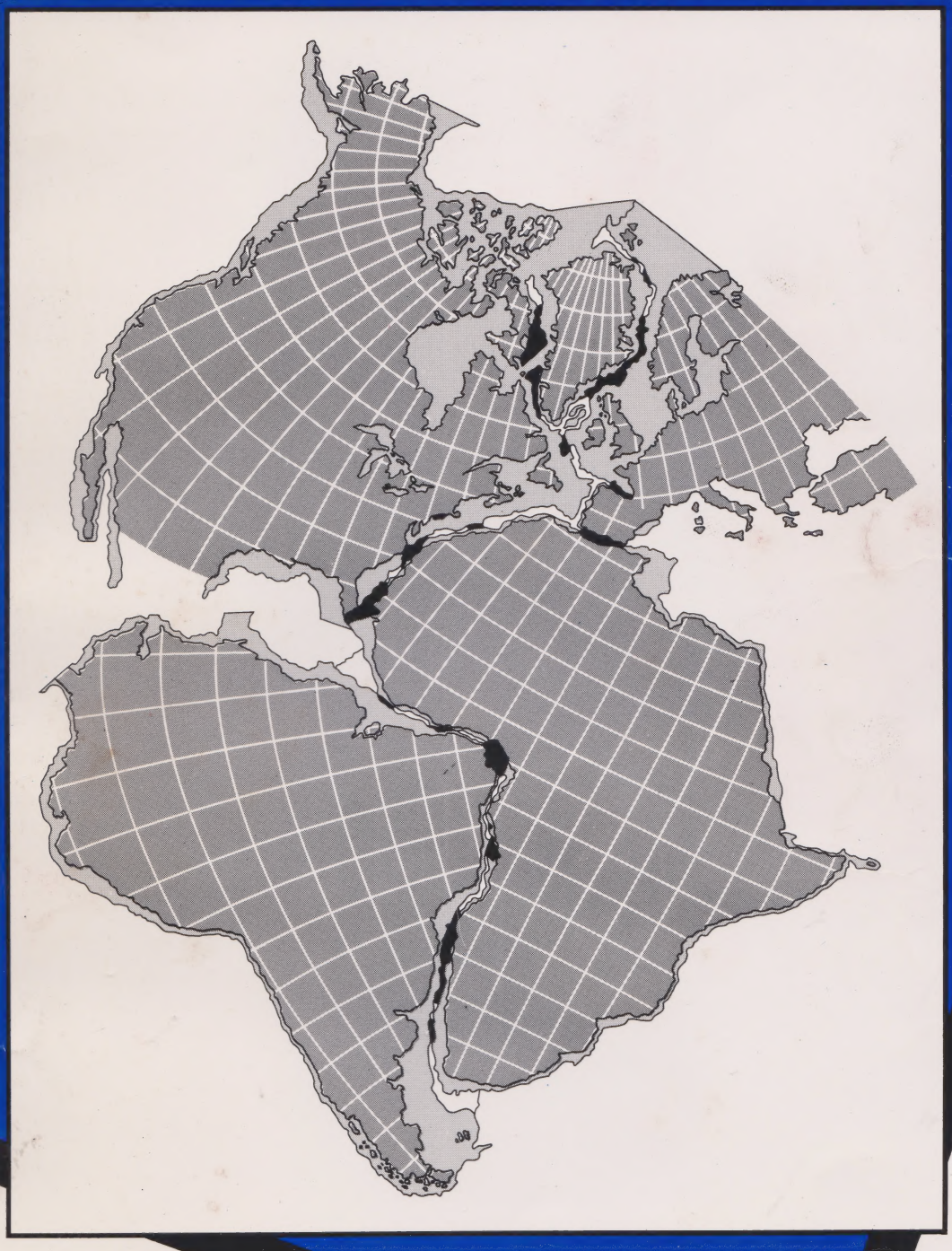
1	Science and the planet Earth
2	Measuring the Solar System
3	Motion under gravity
4	Practical work in science
5–6	Into the Earth: earthquakes, seismology and the Earth's magnetism
7–8	Plate tectonics: a revolution in the Earth sciences
9	Energy
10	Modelling the behaviour of light
11–12	Atomic structure
13–14	Chemical reactions and the Periodic Table
15	Chemical equilibrium
16	Chemical energetics
17–18	The chemistry of carbon compounds
19	Life and evolution
20	Inheritance and cell division
21	Genes and evolution
22	Biochemistry
23	Physiology
24	DNA: molecular aspects of genetics
25	Ecology
26	Biology reviewed
27	Earth materials and processes
28–29	Geological time and Earth history
30	Quantum mechanics: an introduction
31	Quantum mechanics: atoms and nuclei
32	The search for fundamental particles

ISBN 0 335 16327 0

S102 UNITS 7–8

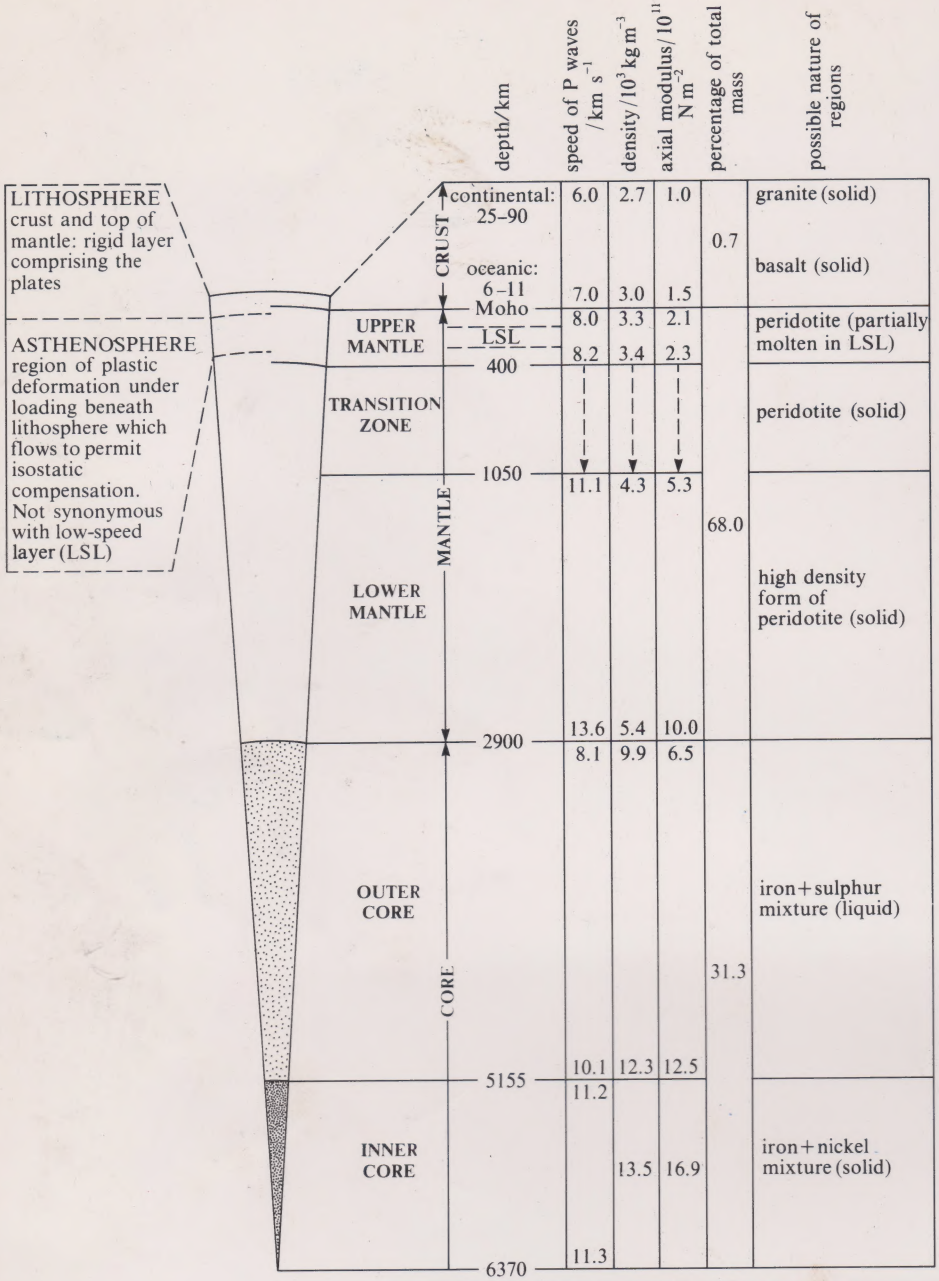
THE OPEN UNIVERSITY
S102: A SCIENCE FOUNDATION COURSE

SCIENCE



Units 7–8
Plate tectonics: a revolution in the Earth sciences

PROPERTIES OF THE EARTH'S INTERIOR



S102 UNITS

1	Science and the planet Earth
2	Measuring the Solar System
3	Motion under gravity
4	Practical work in science
5–6	Into the Earth: earthquakes, seismology and the Earth's magnetism
7–8	Plate tectonics: a revolution in the Earth sciences
9	Energy
10	Modelling the behaviour of light
11–12	Atomic structure
13–14	Chemical reactions and the Periodic Table
15	Chemical equilibrium
16	Chemical energetics
17–18	The chemistry of carbon compounds
19	Life and evolution
20	Inheritance and cell division
21	Genes and evolution
22	Biochemistry
23	Physiology
24	DNA: molecular aspects of genetics
25	Ecology
26	Biology reviewed
27	Earth materials and processes
28–29	Geological time and Earth history
30	Quantum mechanics: an introduction
31	Quantum mechanics: atoms and nuclei
32	The search for fundamental particles

ISBN 0 335 163289

S102 UNITS 9 AND 10

THE OPEN UNIVERSITY
S102: A SCIENCE FOUNDATION COURSE

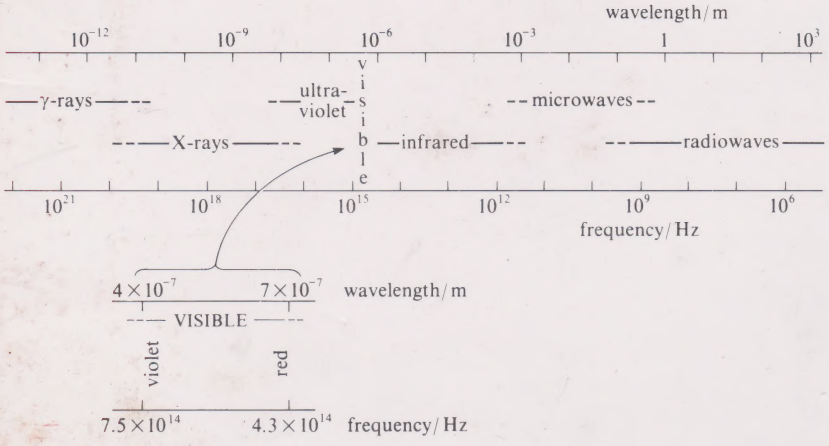
SCIENCE

Unit 9
Energy

Unit 10
Modelling the behaviour of light

USEFUL INFORMATION FOR THE PHYSICS AND GENERAL SCIENCE UNITS

ELECTROMAGNETIC SPECTRUM



PHYSICAL CONSTANTS

Symbol	Quantity	Approximate value
G	gravitational constant	$6.672 \times 10^{-11}\,\mathrm{N\,m^2\,kg^{-2}}$
c	speed of light in a vacuum	$2.998 \times 10^{8}\,\mathrm{m\,s^{-1}}$
h	Planck's constant	$6.626 \times 10^{-34}\,\mathrm{J\,s}$
e	magnitude of the charge of the electron	$1.602 \times 10^{-19}\,\mathrm{C}$
m_e	mass of the electron	$9.110 \times 10^{-31}\,\mathrm{kg}$
m_n	mass of the neutron	$1.675 \times 10^{-27}\,\mathrm{kg}$
m_p	mass of the proton	$1.673 \times 10^{-27}\,\mathrm{kg}$

USEFUL QUANTITIES AND CONVERSIONS

$\pi \approx 3.142$

1 mile $\approx$ 1.609 km

1 kilometre (km) $\approx$ 0.6214 mile

1 inch = 2.54 cm

1 centimetre (cm) $\approx$ 0.3937 inch

1 kilocalorie $\approx$ 4 187 J

1 electronvolt (eV) $\approx 1.602 \times 10^{-19}$ J

1 radian $\approx$ 57.296 degrees

1 degree $\approx$ 0.01745 radian

1 GeV/$c^2 \approx 1.783 \times 10^{-27}$ kg

Earth radius (equatorial) $\approx 6.38 \times 10^{6}$ m

circumference of the Earth (distance round the Equator) $\approx 4.01 \times 10^{7}$ m

radius of the Moon $\approx 1.74 \times 10^{6}$ m

radius of the Sun $\approx 6.96 \times 10^{8}$ m

Earth–Sun distance (i.e. orbital radius of the Earth) $\approx 1.50 \times 10^{11}$ m

Earth–Moon distance (i.e. orbital radius of the Moon) $\approx 3.84 \times 10^{8}$ m

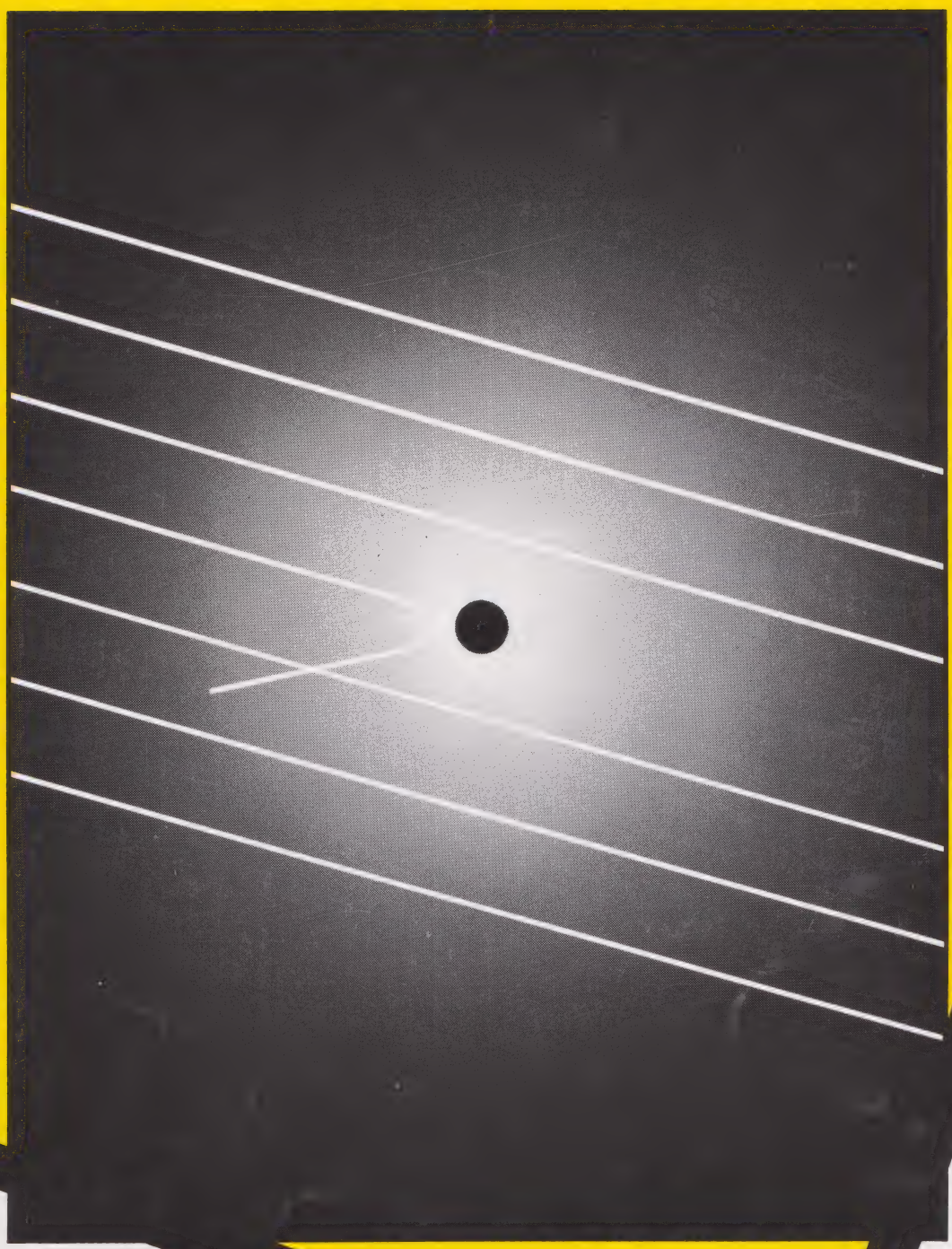
S102 UNITS

ISBN 0 335 163297

S102 UNITS 11–12

THE OPEN UNIVERSITY
S102: A SCIENCE FOUNDATION COURSE

SCIENCE



Units 11–12
Atomic structure

THE PERIODIC TABLE

I	II										III	IV	V	VI	VII	0
																2 He
1 H																
3 Li	4 Be										5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg										13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57–70 lanthanides	71 Lu	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89–102 actinides	103 Lr	104	105													

transition elements

typical elements

lanthanides

57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb

89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No

actinides

S102 UNITS

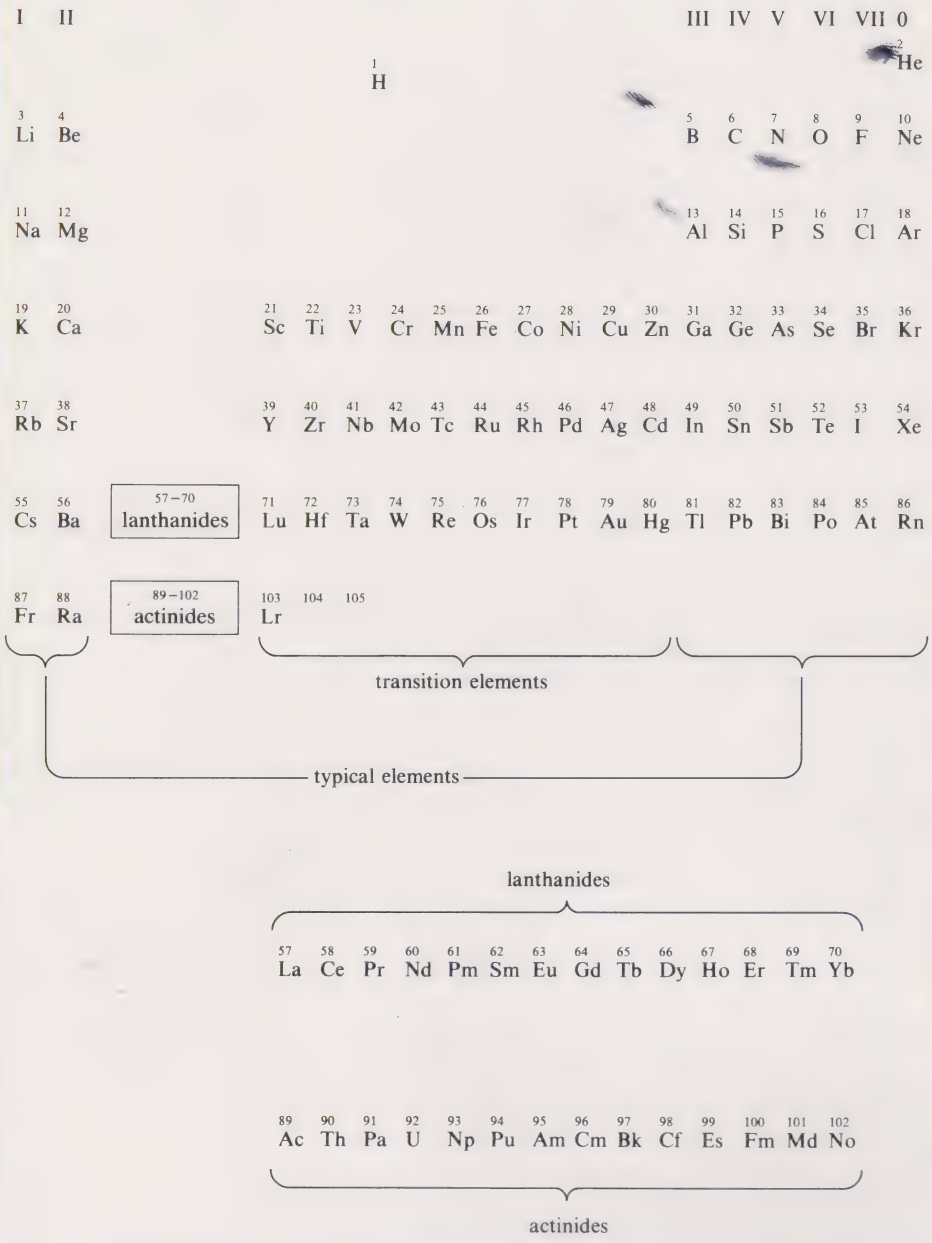
ISBN 0 335 163300

THE OPEN UNIVERSITY
S102: A SCIENCE FOUNDATION COURSE

SCIENCE

Units 13–14
Chemical reactions and the Periodic Table

THE PERIODIC TABLE



S102 UNITS

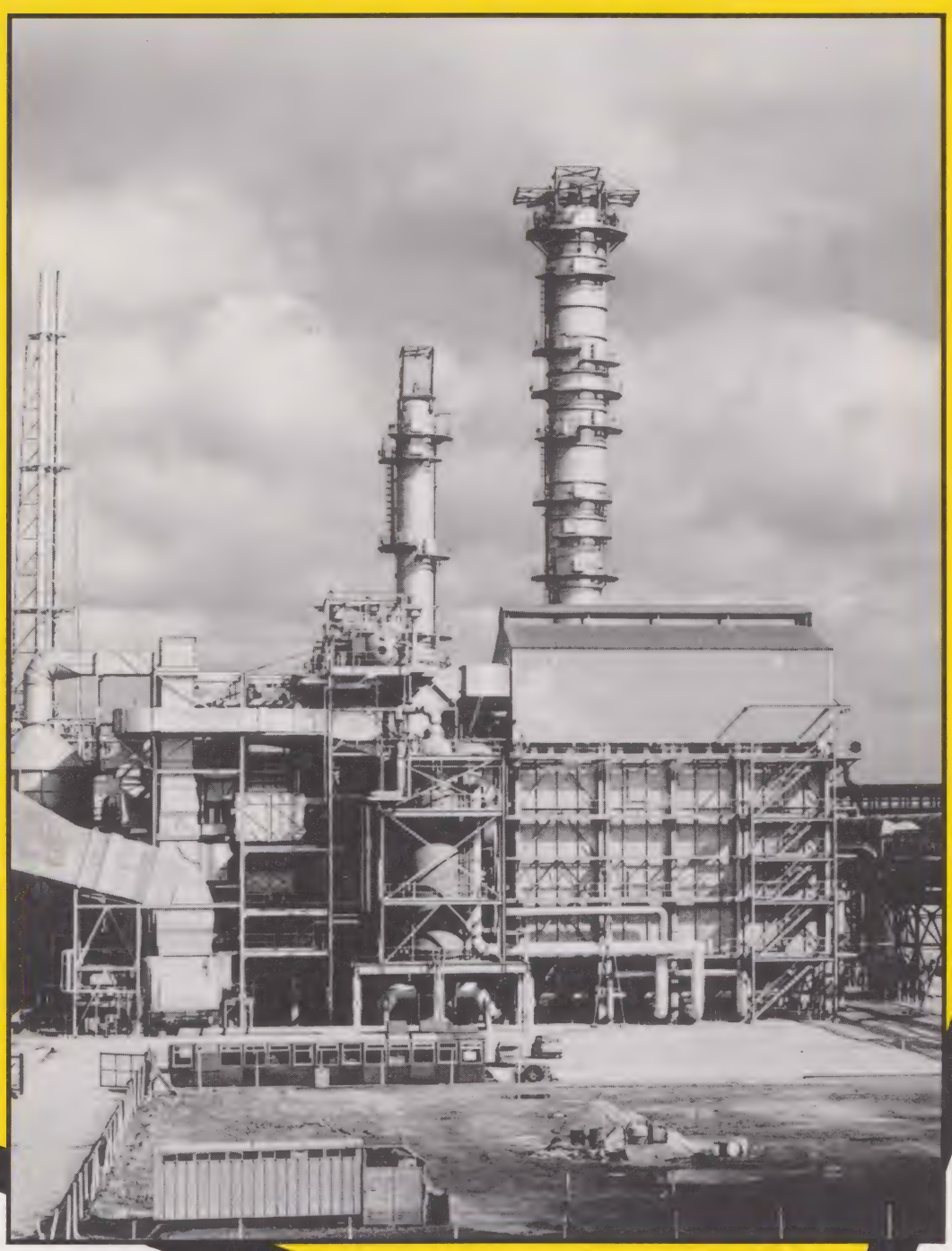
1	Science and the planet Earth
2	Measuring the Solar System
3	Motion under gravity
4	Practical work in science
5–6	Into the Earth: earthquakes, seismology and the Earth's magnetism
7–8	Plate tectonics: a revolution in the Earth sciences
9	Energy
10	Modelling the behaviour of light
11–12	Atomic structure
13–14	Chemical reactions and the Periodic Table
15	Chemical equilibrium
16	Chemical energetics
17–18	The chemistry of carbon compounds
19	Life and evolution
20	Inheritance and cell division
21	Genes and evolution
22	Biochemistry
23	Physiology
24	DNA: molecular aspects of genetics
25	Ecology
26	Biology reviewed
27	Earth materials and processes
28–29	Geological time and Earth history
30	Quantum mechanics: an introduction
31	Quantum mechanics: atoms and nuclei
32	The search for fundamental particles

ISBN 0 335 163319

S102 UNITS 15 AND 16

THE OPEN UNIVERSITY
S102: A SCIENCE FOUNDATION COURSE

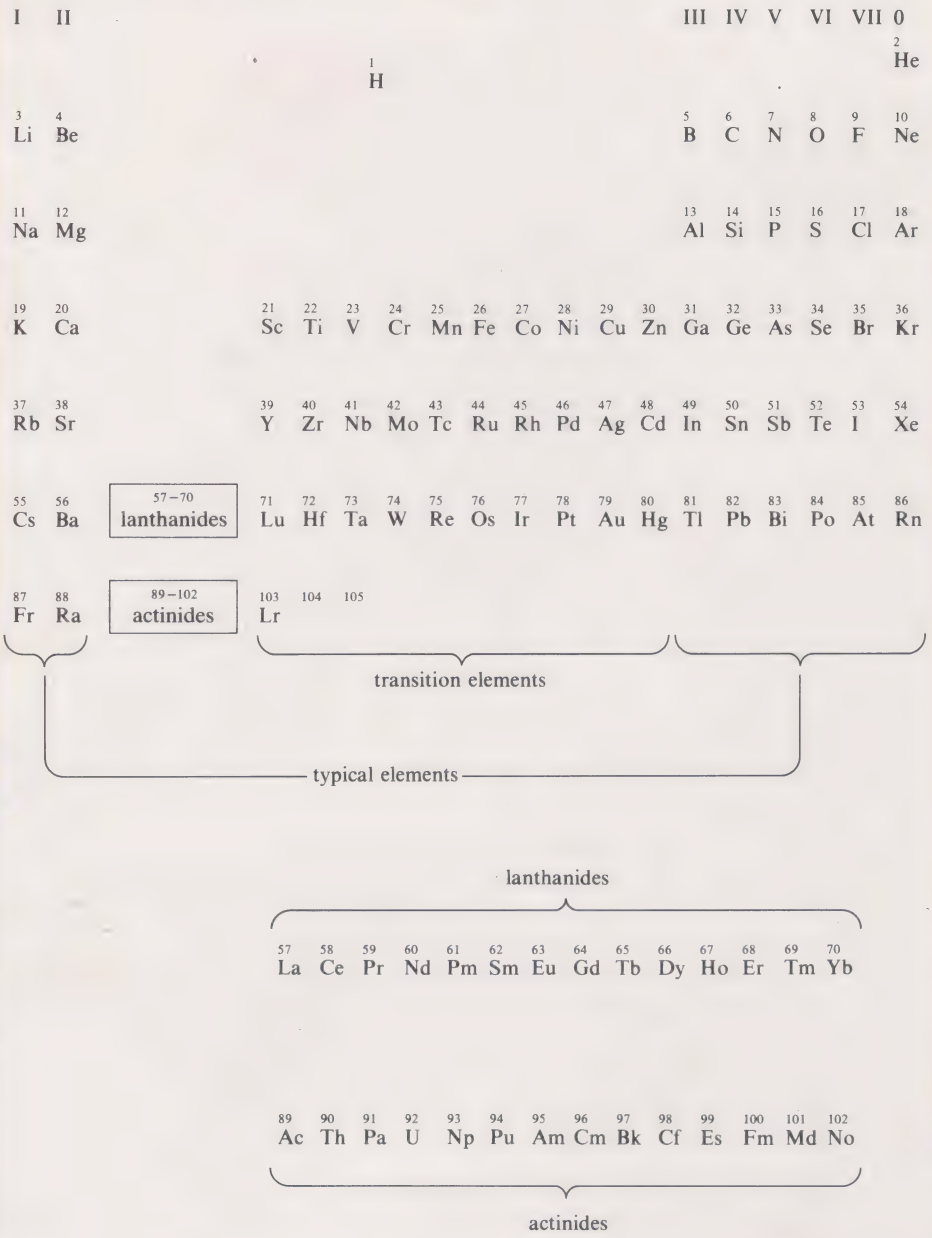
SCIENCE



Unit 15
Chemical equilibrium

Unit 16
Chemical energetics

THE PERIODIC TABLE



S102 UNITS

1	Science and the planet Earth
2	Measuring the Solar System
3	Motion under gravity
4	Practical work in science
5–6	Into the Earth: earthquakes, seismology and the Earth's magnetism
7–8	Plate tectonics: a revolution in the Earth sciences
9	Energy
10	Modelling the behaviour of light
11–12	Atomic structure
13–14	Chemical reactions and the Periodic Table
15	Chemical equilibrium
16	Chemical energetics
17–18	The chemistry of carbon compounds
19	Life and evolution
20	Inheritance and cell division
21	Genes and evolution
22	Biochemistry
23	Physiology
24	DNA: molecular aspects of genetics
25	Ecology
26	Biology reviewed
27	Earth materials and processes
28–29	Geological time and Earth history
30	Quantum mechanics: an introduction
31	Quantum mechanics: atoms and nuclei
32	The search for fundamental particles

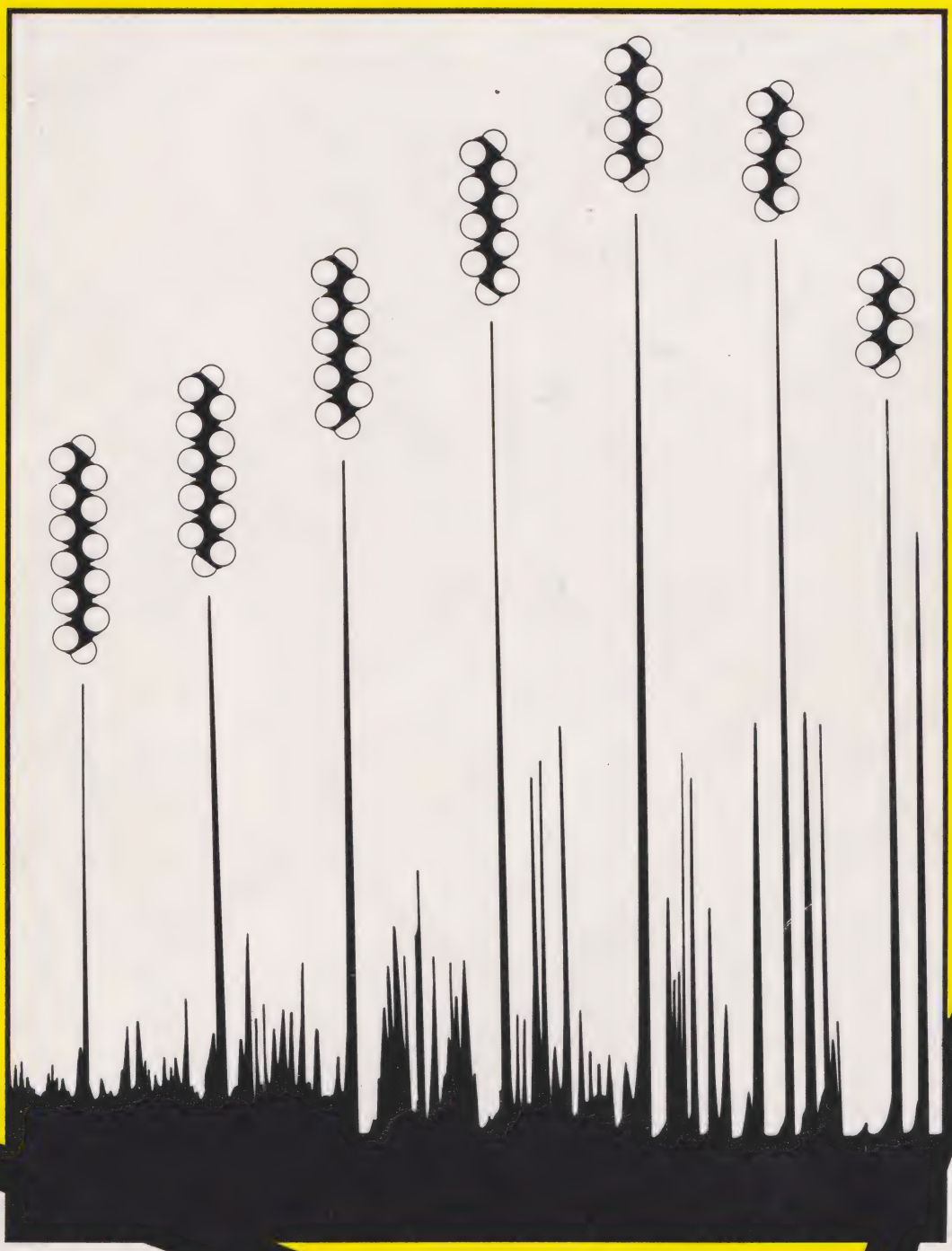
0335163327

ISBN 0 335 163327

S102 UNITS 17–18

THE OPEN UNIVERSITY
S102: A SCIENCE FOUNDATION COURSE

SCIENCE



Units 17–18
The chemistry of carbon compounds

THE PERIODIC TABLE

I	II										III	IV	V	VI	VII	0
																2 He
1 H																
3 Li	4 Be										5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg										13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57–70 lanthanides	71 Lu	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89–102 actinides	103 Lr	104	105													

transition elements

typical elements

lanthanides

57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb

89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No

actinides

S102 UNITS

ISBN 0 335 16333 5

S102 UNITS 19, 20 AND 21

THE OPEN UNIVERSITY
S102: A SCIENCE FOUNDATION COURSE

SCIENCE

Unit 19
Life and evolution

Unit 20
Inheritance and cell division

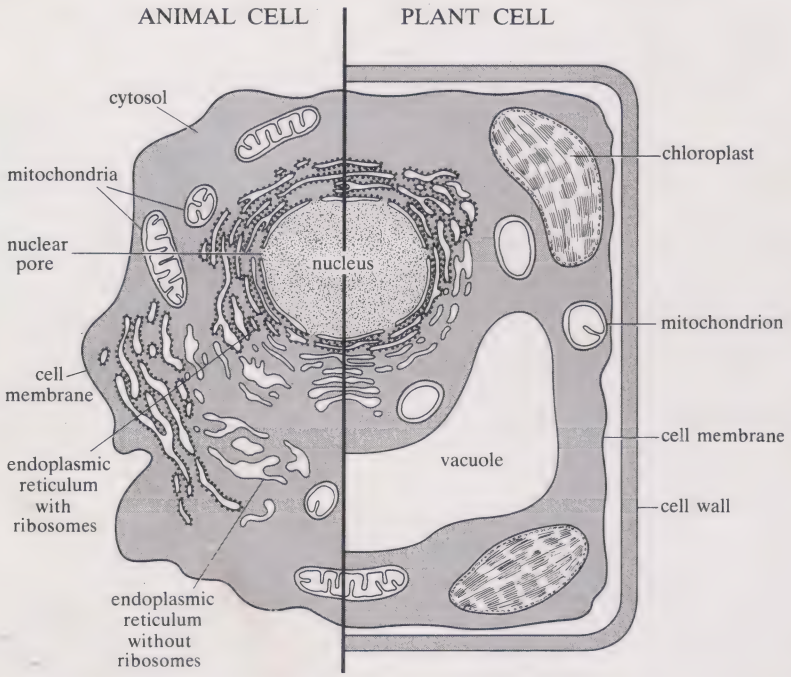
Unit 21
Genes and evolution

USEFUL INFORMATION FOR THE BIOLOGY UNITS: CHEMICALS, CELLS AND CLASSIFICATION

All cellular organisms contain these four biopolymers (made up of the monomers shown below).

Biopolymers:	polysaccharides	proteins	DNA	RNA
Monomers:	monosaccharides	amino acids	deoxyribonucleotides	ribonucleotides

All eukaryotic organisms have cells of the following generalized structure.



All living organisms can be divided into four kingdoms. The figures in brackets show the number of species (in thousands) in each subkingdom.

Animals	Plants	Fungi	Prokaryotes
sponges (4)	eukaryotic algae (20)	slime moulds (0.5)	bacteria (1.6)
unicells (40)	true plants (330)	true fungi (100)	blue-green bacteria (formerly termed blue-green algae) (1.5)
multicells (1 000–2 000)			

S102 UNITS

1	Science and the planet Earth
2	Measuring the Solar System
3	Motion under gravity
4	Practical work in science
5–6	Into the Earth: earthquakes, seismology and the Earth's magnetism
7–8	Plate tectonics: a revolution in the Earth sciences
9	Energy
10	Modelling the behaviour of light
11–12	Atomic structure
13–14	Chemical reactions and the Periodic Table
15	Chemical equilibrium
16	Chemical energetics
17–18	The chemistry of carbon compounds
19	Life and evolution
20	Inheritance and cell division
21	Genes and evolution
22	Biochemistry
23	Physiology
24	DNA: molecular aspects of genetics
25	Ecology
26	Biology reviewed
27	Earth materials and processes
28–29	Geological time and Earth history
30	Quantum mechanics: an introduction
31	Quantum mechanics: atoms and nuclei
32	The search for fundamental particles

ISBN 0 335 163343

S102 UNITS 22 AND 23

THE OPEN UNIVERSITY
S102: A SCIENCE FOUNDATION COURSE

SCIENCE

Unit 22
Biochemistry

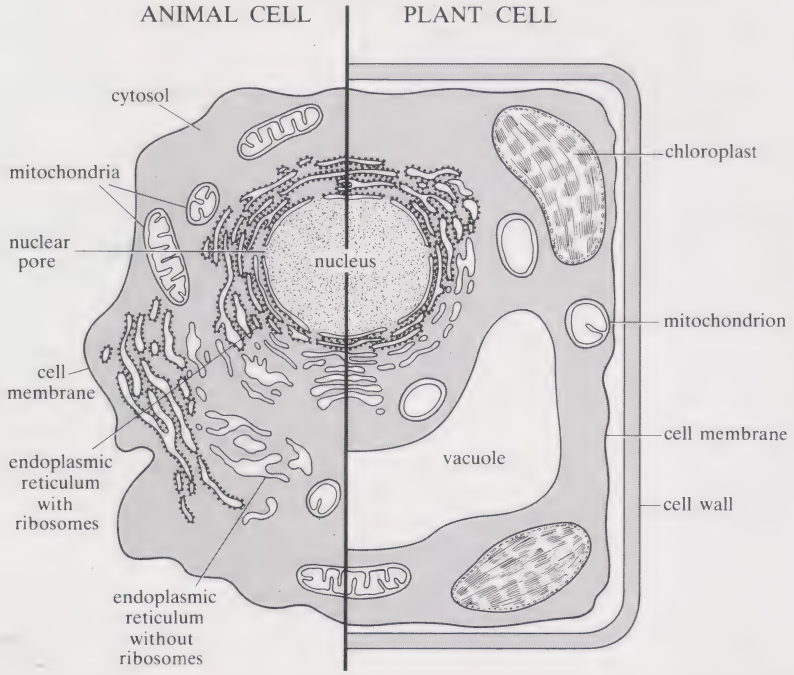
Unit 23
Physiology

USEFUL INFORMATION FOR THE BIOLOGY UNITS: CHEMICALS, CELLS AND CLASSIFICATION

All cellular organisms contain these four biopolymers (made up of the monomers shown below).

Biopolymers:	polysaccharides	proteins	DNA	RNA
Monomers:	monosaccharides	amino acids	deoxyribonucleotides	ribonucleotides

All eukaryotic organisms have cells of the following generalized structure.



All living organisms can be divided into four kingdoms. The figures in brackets show the number of species (in thousands) in each subkingdom.

Animals	Plants	Fungi	Prokaryotes
sponges (4)	eukaryotic algae (20)	slime moulds (0.5)	bacteria (1.6)
unicells (40)	true plants (330)	true fungi (100)	blue-green bacteria (formerly termed blue-green algae) (1.5)
multicells (1 000–2 000)			

S102 UNITS

1	Science and the planet Earth	19	Life and evolution
2	Measuring the Solar System	20	Inheritance and cell division
3	Motion under gravity	21	Genes and evolution
4	Practical work in science	22	Biochemistry
5–6	Into the Earth: earthquakes, seismology and the Earth's magnetism	23	Physiology
		24	DNA: molecular aspects of genetics
7–8	Plate tectonics: a revolution in the Earth sciences	25	Ecology
		26	Biology reviewed
9	Energy	27	Earth materials and processes
10	Modelling the behaviour of light	28–29	Geological time and Earth history
11–12	Atomic structure		
13–14	Chemical reactions and the Periodic Table	30	Quantum mechanics: an introduction
15	Chemical equilibrium	31	Quantum mechanics: atoms and nuclei
16	Chemical energetics		
17–18	The chemistry of carbon compounds	32	The search for fundamental particles

ISBN 0 335 16336 X

S102 UNITS 24, 25 AND 26

THE OPEN UNIVERSITY
S102: A SCIENCE FOUNDATION COURSE

SCIENCE

Unit 24
DNA: molecular aspects of genetics

Unit 25
Ecology

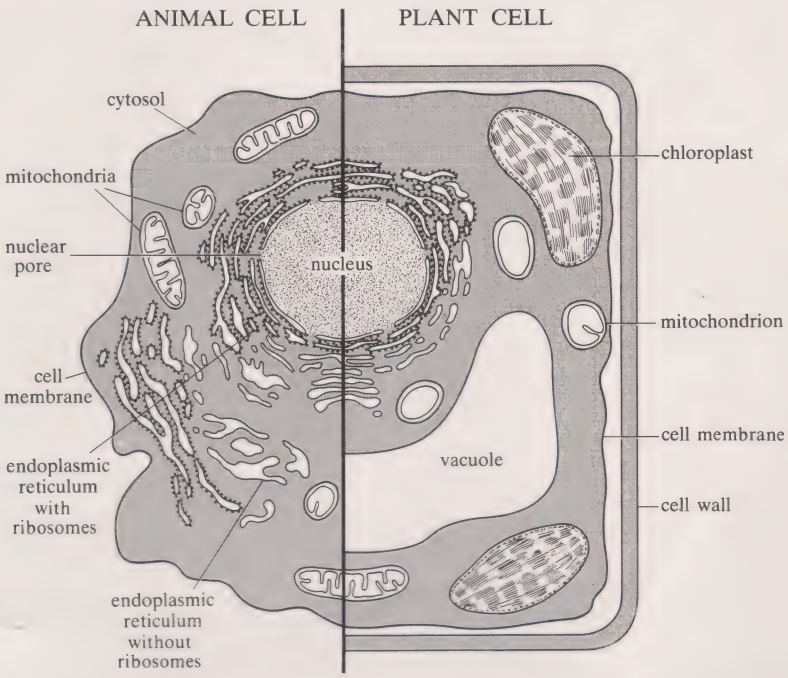
Unit 26
Biology reviewed

USEFUL INFORMATION FOR THE BIOLOGY UNITS: CHEMICALS, CELLS AND CLASSIFICATION

All cellular organisms contain these four biopolymers (made up of the monomers shown below).

Biopolymers:	polysaccharides	proteins	DNA	RNA
Monomers:	monosaccharides	amino acids	deoxyribonucleotides	ribonucleotides

All eukaryotic organisms have cells of the following generalized structure.



All living organisms can be divided into four kingdoms. The figures in brackets show the number of species (in thousands) in each subkingdom.

Animals	Plants	Fungi	Prokaryotes
sponges (4)	eukaryotic algae (20)	slime moulds (0.5)	bacteria (1.6)
unicells (40)	true plants (330)	true fungi (100)	blue-green bacteria (formerly termed blue-green algae) (1.5)
multicells (1 000–2 000)			

S102 UNITS

1	Science and the planet Earth
2	Measuring the Solar System
3	Motion under gravity
4	Practical work in science
5–6	Into the Earth: earthquakes, seismology and the Earth's magnetism
7–8	Plate tectonics: a revolution in the Earth sciences
9	Energy
10	Modelling the behaviour of light
11–12	Atomic structure
13–14	Chemical reactions and the Periodic Table
15	Chemical equilibrium
16	Chemical energetics
17–18	The chemistry of carbon compounds
19	Life and evolution
20	Inheritance and cell division
21	Genes and evolution
22	Biochemistry
23	Physiology
24	DNA: molecular aspects of genetics
25	Ecology
26	Biology reviewed
27	Earth materials and processes
28–29	Geological time and Earth history
30	Quantum mechanics: an introduction
31	Quantum mechanics: atoms and nuclei
32	The search for fundamental particles

ISBN 0 335 163378

S102 UNITS 27 AND 28–29

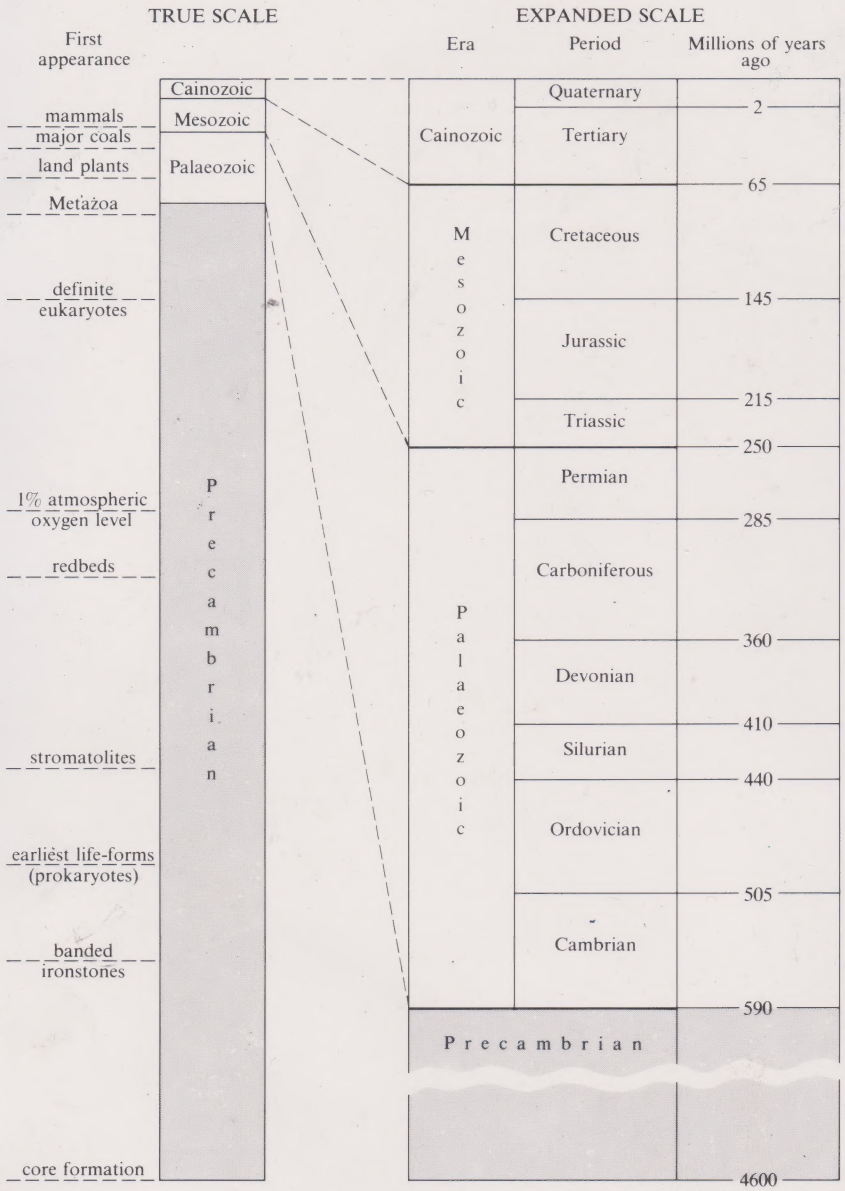
THE OPEN UNIVERSITY
S102 A SCIENCE FOUNDATION COURSE

SCIENCE

Unit 27
Earth materials and processes

Units 28 – 29
Geological time and Earth history

EARTH HISTORY AND STRATIGRAPHIC COLUMN



S102 UNITS

1	Science and the planet Earth
2	Measuring the Solar System
3	Motion under gravity
4	Practical work in science
5–6	Into the Earth: earthquakes, seismology and the Earth's magnetism
7–8	Plate tectonics: a revolution in the Earth sciences
9	Energy
10	Modelling the behaviour of light
11–12	Atomic structure
13–14	Chemical reactions and the Periodic Table
15	Chemical equilibrium
16	Chemical energetics
17–18	The chemistry of carbon compounds
19	Life and evolution
20	Inheritance and cell division
21	Genes and evolution
22	Biochemistry
23	Physiology
24	DNA: molecular aspects of genetics
25	Ecology
26	Biology reviewed
27	Earth materials and processes
28–29	Geological time and Earth history
30	Quantum mechanics: an introduction
31	Quantum mechanics: atoms and nuclei
32	The search for fundamental particles

ISBN 0 335 16339 4

S102 UNITS 30, 31 AND 32

THE OPEN UNIVERSITY
S102: A SCIENCE FOUNDATION COURSE

SCIENCE

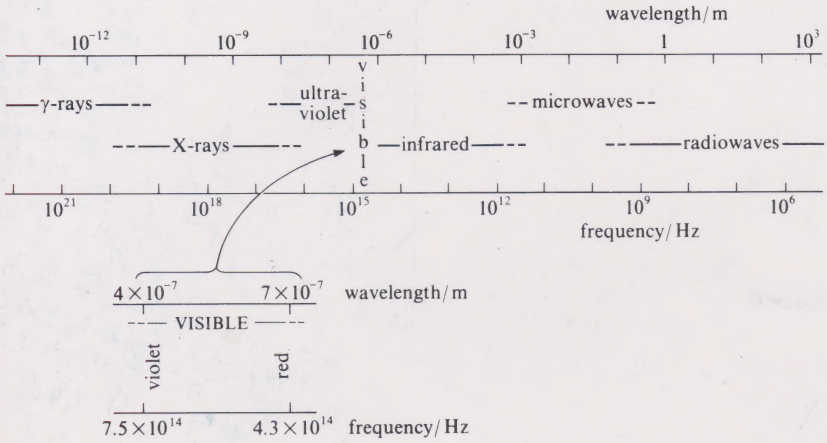
Unit 30
Quantum mechanics: an introduction

Unit 31
Quantum mechanics: atoms and nuclei

Unit 32
The search for fundamental particles

USEFUL INFORMATION FOR THE PHYSICS AND GENERAL SCIENCE UNITS

ELECTROMAGNETIC SPECTRUM



PHYSICAL CONSTANTS

Symbol	Quantity	Approximate value
G	gravitational constant	$6.672 \times 10^{-11}\,\mathrm{N\,m^2\,kg^{-2}}$
c	speed of light in a vacuum	$2.998 \times 10^{8}\,\mathrm{m\,s^{-1}}$
h	Planck's constant	$6.626 \times 10^{-34}\,\mathrm{J\,s}$
e	magnitude of the charge of the electron	$1.602 \times 10^{-19}\,\mathrm{C}$
m_e	mass of the electron	$9.110 \times 10^{-31}\,\mathrm{kg}$
m_n	mass of the neutron	$1.675 \times 10^{-27}\,\mathrm{kg}$
m_p	mass of the proton	$1.673 \times 10^{-27}\,\mathrm{kg}$

USEFUL QUANTITIES AND CONVERSIONS

$\pi \approx 3.142$

1 mile $\approx$ 1.609 km

1 kilometre (km) $\approx$ 0.6214 mile

1 inch = 2.54 cm

1 centimetre (cm) $\approx$ 0.3937 inch

1 kilocalorie $\approx$ 4 187 J

1 electronvolt (eV) $\approx 1.602 \times 10^{-19}$ J

1 radian $\approx$ 57.296 degrees

1 degree $\approx$ 0.01745 radian

1 GeV/$c^2 \approx 1.783 \times 10^{-27}$ kg

Earth radius (equatorial) $\approx 6.38 \times 10^{6}$ m

circumference of the Earth (distance round the Equator) $\approx 4.01 \times 10^{7}$ m

radius of the Moon $\approx 1.74 \times 10^{6}$ m

radius of the Sun $\approx 6.96 \times 10^{8}$ m

Earth–Sun distance (i.e. orbital radius of the Earth) $\approx 1.50 \times 10^{11}$ m

Earth–Moon distance (i.e. orbital radius of the Moon) $\approx 3.84 \times 10^{8}$ m

S102 UNITS

ISBN 0 335 16341 6